MAY-JUNE, 1988

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HyperAge

The Journal of HyperThinking

HYPERMEDIA and EXPERT SYSTEMS

By DAN SHAFER

INTERACTIVE VIDEO WITH HYPERCARD

By FABRICE FLORIN

- Pioneers of Hypermedia: Doug Engelbart
- Jan Lewis on the Microsoft CD-ROM Conference
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HyperAge™

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MAY-JUNE, 1988

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EDITORIAL

Microsoft CD-ROM Conference

copyright Jan Lewis 1988

Every year since Microsoft started holding its annual CD-ROM (Compact Disc-Read Only Memory) conferences, we have used these meetings as an indicator of industry trends and directions. In March of this year, Microsoft held its Third Annual CD-ROM Conference, and it became clear that the development paths of CD-ROM and hypermedia are intermingled in a very unique way. Let me explain.

If we look at every technology which has turned into an advance in human communication, we find the technology passes through three critical periods of testing and discovery. First, can the technology work? Second, can we do anything with it? Third, can we do anything *new* with it, i.e. anything we couldn't do before?

The history of motion pictures is an example to which we can all relate. Early implementations of new technologies usually consist of taking existing ''software'' and simply ''porting'' it to the new medium. Early films, for example, were simply stage plays captured onto celluloid. Film didn't come into it's potential until D.W. Griffith figured out how to produce something using the camera that could *not* be produced in a stage play. By removing the stage, changing camera angles, and using motion, film as a medium was able to give birth to a new language of art and communication.

The situation with CD-ROM is remarkably similar. Ironically, we've been able to observe these three phases in the three years since March 1986, the first Microsoft CD-ROM conference. Initially, the emphasis was on the technology itself. What manufacturers would make the drives? What would they cost? How would you encode data? Then came the early applications of CD-ROM, including products like Grolier's Encyclopedia and Microsoft Bookshelf, a collection of library reference books including dictionary, thesaurus, zip code directory, quotations, and the like, all ported onto one CD-ROM and attached to your personal computer. Both Bookshelf and Grolier's Encyclopedia are still basically conversions of the old medium to CD-ROM -- a little easier and less bulky, perhaps, but essentially a reference library. State-of-the-art retrieval software for CD-ROM information was thought to be full-text retrieval, and issues of the day centered around index inversion, proximity comparisons, and boolean operation.

But this year, the focus throughout the conference was on exploring the question what new can be done? And the answer was loud and clear: hypermedia. You couldn't create non-linear applications when chained to the heritage of books. But with the combination of CD-ROM and modern navigation tools, state-of-the-art retrieval software lets you explore information by associative links. Emphasis at this year's conference was defining linkages and relationships within the content.

CD-ROM has the potential for delivering huge amounts of data. The problem is that with the increased complexity of the information space, the navigation tools must make it that much easier for the end-user. Owl International's Guide and Apple's HyperCard, among others, are facilitating the development of commercially available mass information in addressing this issue. Nearly a hundred companies have demonstrated their commitment to developing CD-ROM into a viable technology, and this year we will see the first major appearance of both hardware and software in your local computer store. Apple, Atari, and Tandy will all be marketing CD-ROM readers in their retail dealerships. That's over 5000 stores nationwide showing and selling and stimulating the development of the market, and pricing is sure to continue it's downward trend.

All this is very significant for hypermedia developers and users. As the Third Microsoft Conference on CD-ROM has demonstrated, the market is poised to expand rapidly. In expectation, over 500 future producers attended the Apple Developer's Conference following the Microsoft meetings, where Apple positioned HyperCard 1.1 CD as the CD-ROM navigation tool of preference. We can expect a wealth of new products for the next conference, where the question will not be what we can do, but how we are doing.

— Jan Lewis

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LETTERS TO THE EDITOR

HYPERVENTILATION!

Timing is Right

To the Editor:

Congratulations on your new publication and best of luck. I think your timing is right on and hypermedia promises to be a very important development in the industry and deserves a quality publication. Please enter my subscription.

George Grodahl
Broadview Associates

Stack Says It All

To the Editor:

Good job. I haven't looked at your magazine yet, but your Media Stack is terrific. I'm no HyperCard expert, but I must say that the stack says more about the potential of HyperCard than anything I've seen, read, heard or loaded into memory. Contratulations.

Larry Magid
Producer, The Computer Show

PC or Not PC

To the Editor:

I received the premier issue of Hyperage. Thank you for providing this option. I thought about whether or not to send this message.

I am heavily into HC script writing and enjoy it a lot. For the time being I do not intend to subscribe to Hyperage; I would like to share with you my reason for declining. Hyperage represents a lot of hard work and is presented quite well with one drawback... Hyperage is not Macintosh only.

The inclusion of MS DOS was a most unpleasant surprise. I know what I'm talking about here as I work deep within MS DOS at work and use my Mac at home. Using MS DOS is like reading the white pages of the phone book or like waiting for a delayed flight with nothing to read. The idea of running MS DOS on a Mac is like driving a Ferrari down a dirt road. The reason I bought a Mac is to get as far away from MS DOS as possible.

Enough said. If you contemplate publishing a Macintosh-only periodical, I will be highly interested in subscribing. Thank you for reading through this. My intent is purely constructive. There are a number of PC converts in our user group who never want to go down the dirt road of MS DOS again. Taking this into account, I hope that this message can be construed as useful to you.

Jack Carr

Sound Quality Critical

To the Editor:

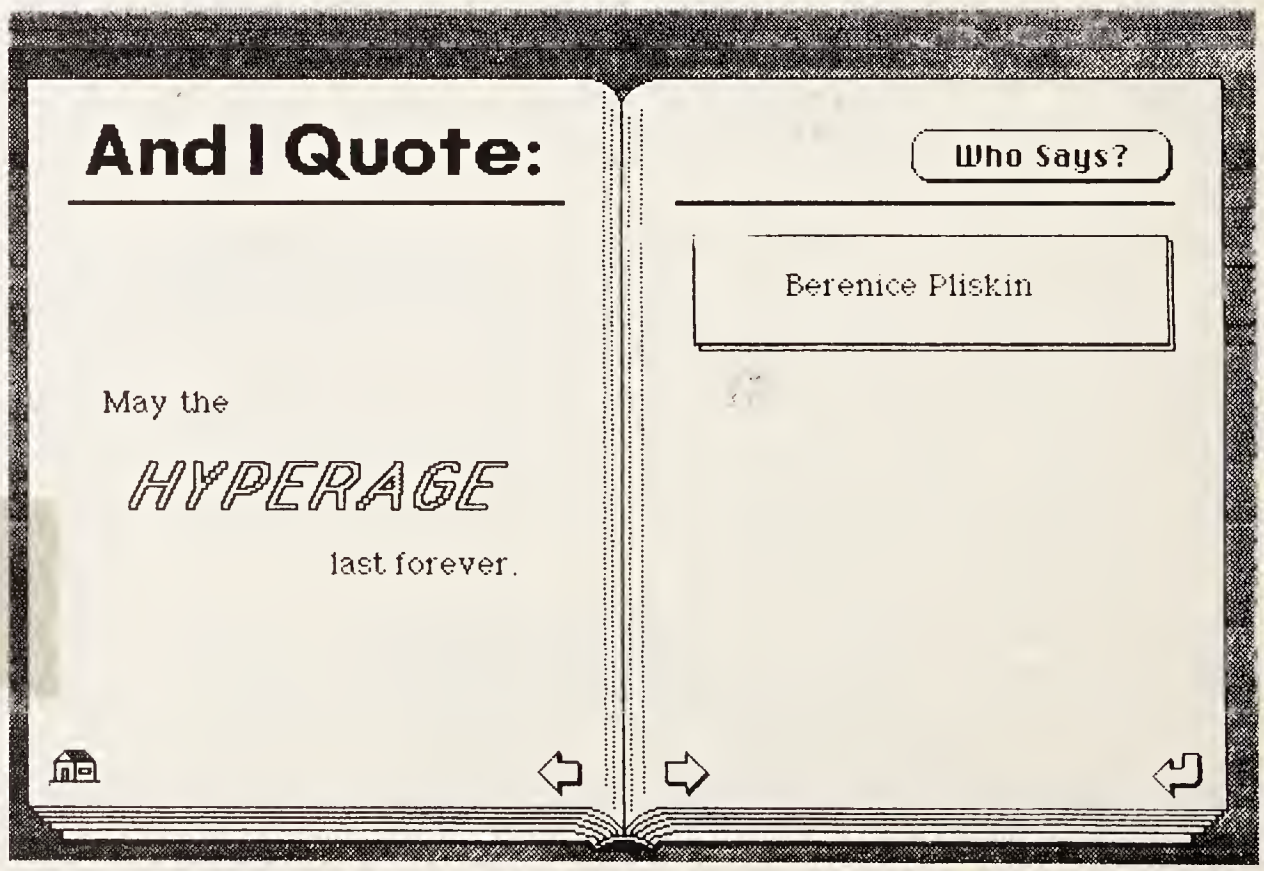
I just finished reading the article by Tim Oren in your premiere issue entitled ''Interactive Sound in HyperCard'' and would like to make a few comments about sampling on the MacIntosh.

First, Mr. Oren states that, ''a sampling rate of 5.5KHz will lose sounds above 2,750 Hertz.'' While I don't disagree with this statement I do feel that he failed to mention the effect this has on the harmonic structure of sounds (which is true at any sample rate). What makes sounds recognizable from others is the harmonic overtone series, a number of pitches above the fundamental (base frequency). If you were to sample a sound other than a sine wave at 2,750 Hertz the anti-aliasing filters would remove the upper harmonics leaving little more than a sine wave. This can be very distressing if you are trying to sample a flute or violin.

Second, the use of an anti-aliasing filter to remove frequencies above the Nyquist frequency is a common practice, but to those who buy the SoundWave digitizer should know that no filter can cut off all the frequencies above the Nyquist immediately. These filters have a gradual slope to them, so that in order to completely remove all frequencies past the Nyquist frequency one must actually start rolling off the hi-end frequencies BEFORE the Nyquist frequency. This will lower the frequency response of your sampler, but will effectively eliminate aliasing. To expand the frequency response to its greatest while giving room for the Nyquist frequency, you should use the highest sample rate available. While this is going to cost you memory in the long run, it is the best solution if you wish to have the highest quality sound samples.

Eric Kauschen

Tim Oren Replies: *Mr. Kauschen's observations on the effects of aliasing and filtering are correct and should be taken into consideration when choosing a sampling rate. However, when lower cost equipment such as a Mac Plus or older hard disks is used, it may not be possible to sustain continuous, synchronized sound at the highest (22 KHz) sampling rate. Even when these performance limitations force use of the 11 KHz rate, it is possible to achieve quite dramatic effects. The success of television over the last forty years shows that an audiophile quality sound track is not necessary to produce a significant impact on viewers.*



The Call of the Ocean:
Hypertext Universal and Open

The idea of hypertext -- nonsequential writing on computer screens -- so easily sets people aflame.

It set me on fire about thirty years ago, and I have preached the word since then. Lately, I have been told by those who heard me in the mid-sixties that the idea excited them too, except they didn't really think it was possible.

Now, finally, hypertext is an idea whose time has come. With the advent of *GUIDE*, the hypertext system from Owl, and HyperCard, Apple's wonderful software construction set, even beginners can create text, graphics, even movies that respond and branch to the user's pokes of the mouse. Hypertext, hypergraphics, hypermedia have reached our fingertips. And in the magic aura of this form of interaction, we can see a whole new world beckoning.

It is possible to look beyond today's scrambled and fragmented computer world, where so little is compatible, so little can be tied together, and so much is junk, to a tomorrow that joins our work and writings in a new electronic literature -- a sweeping, universal, accessible, collaborative and yet individualistic whole.

Imagine everything available and tied together. Grand visions come to mind of what things will be like when "it's all there and linked." The thought of that great body of material calls to us, calls to us like the ocean.

Many beginners think that "hypertext" automatically means such an enormous body of material. I must hasten to point out that something can be "hypertext" without being big. My trusty old definition of hypertext is non-sequential writing where the user may move freely, and to have hypertext connections in even a small body of material can be powerfuly useful.

Imagine the millions of books and magazines that are now on paper... cross connected in many directions, and all available at once through your screen.

But once you have thought about it, there can be no substitute for that greater dream -- the enormous collection, that great ocean of writings, graphics and data that everyone can reach. It's deeply moving.

Universal Hypertext

And that is the vision of universal hypertext: a world in which everything that is published becomes electronically available, in an ever-growing interconnected whole. Imagine the millions of books and magazines that are now on paper, all the published photographs and paintings and sheet music, now cross-connected in many directions, and all available at once through your screen -- streaming over wires or microwave as you summon them in whole or part.

Universal or grand hypertext, then, means a new publishing system -- an accessible great universe of linked documents and graphics (and audio recordings and video and movies.). This is a dream many people now share. The idea that we can get to everything, keep track of everything, add to everything, tie everything together, that we can have it all.

How do you have it all? Not by physically possessing copies of everything: it won't be reasonable, you won't need to. Because it will all be there whenever you look, like your favorite city. Or the South Pacific.

Imagine making your own notes and connections any way you choose in this great interconnected corpus; so that any time you want to reopen this great hypertext world at any of these private annotations that make it your own, it will be like opening a book to a bookmark.

Imagine dropping your bookmarks wherever you choose, with those places being always yours thereafter.

Imagine also publishing new connections and comments between things to show their interconnections every which way.

You will of course be able to buy small fragments from the network on demand. (Some people have thought that electronic publishing would only be for whole documents. This is absurd. There's no sense in sending for a 200,000-word book just to pursue a reference to its Chapter 30.) So we will have fragmentary publishing -- that is, a system which allows users to draw forth any part of what is published, without having to pay, or wait, for anything but what they ask for.

But who will make the links, and what kinds of links will there be? Even if there is a single, universal publishing system, the different forms of linkage can lead to very different worlds. There could be many different connection rules in such a universe. And such different connection rules will have deep

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consequences for the power and usefulness of the medium.

Open Hypertext and Hypermedia

But the ocean of universal hypertext is not enough: we want free sailing on it. Universal hypertext does not necesarily mean open hypertext, by which I mean an assemblage to which anyone may contribute, and in which anyone may publish new connections. We want a hypertext system that is both universal and open. (I will get to specifics a little later.).

A world of open hypertext publishing promises extraordinary new freedom for the mind, a new empowerment of humanity. But not everyone wants to see it happen just this way; partly because no one understands yet.

The Anointed

The most fundamental issue is the question of who may contribute.

Some think that "real literature" consists of a few monolithic works, standing high above a rabble. It is easy to go from this to the view that only anointed contributors and their works should be allowed, on the assumption that those outstanding works can be recognized in advance.

Some believe that participants must have special qualifications, that only certain persons anointed in some way are truly worthy of contributing; that information should be monopolized and that only some should be allowed to write and publish; that information should be a monopoly resource. They see the world of literature as something that has to be carefully controlled.

This view arrives under various pretexts. Sometimes it comes wearing the mortarboard of Professionalism, the view that only some are "qualified." Sometimes it comes wearing the homburg of the publishing industry, the view that only salaried editors have the taste and judgment to decide what the public should see.

But these are essentially styles of information monopoly, the assumption that Information Lords will decide what is to be available, and that the Information Peons (the rest of us) will have to accept what's dished out.

"Definitive Versions"

An interesting variant of this is the view that the world should be restricted to the definitive and authoritative; only a few monolithic works should be made available because otherwise there is no stability, no solid reference point, no definite version of anything. Consider the King James Bible, the Oxford English Dictionary -- works so portentous, upright and important. Where would we be without them? What would happen if their central position were to erode? What if everybody got to do their own?

The open hypertext answer is this: the King James Bible is only one among many holy books; a very good one but just as arguable as the rest; the Oxford English Dictionary is only one among many dictionaries -- a specially good one, but just as arguable as the rest. All the holy books, and all the dictionaries, should be available; as well as all the comments made on them. The important thing is for each viewpoint to be available in its pristine state, with no comments or corrections; and to have shutters that open selectively to whatever linked material the user wants to see.

Different Linking and Access Rules

For there to be grand and universal hypertext, it is only required that things be connected in some way.

A universal hypertext system could have a huge body of text (and whatnot) with many links across it. But what rules prevail in such a universal system will determine what kind of a world it is.

1. Quotations and Context Control

In the age of paper publishing, copyright law has been used both to profit the creators and to restrict other use. In the age of demand electronic publishing, such restriction will not be so easy: the use of quotations will be possible without explicit permission. In the coming world of electronic publishing, it will no longer be possible to control the context in which a work is seen, or who may quote from it, because the publisher will not be able to control connections and comments from other documents.

This is inherent in the nature of user-controlled reading and writing on screens. For if a work is available on line, any reader may draw it into his or her screen machine and place it on the screen near anything, where it may be seen, commented on, and connected at pleasure.

Moreover, to quote from a work will only be to state a computer storage address where that quotation is to be found, saying in effect, "when the reader gets to this point, go buy a copy of the quotation that goes here and place it on the screen." Thus a work may be quoted without permission, provided it is available on line.

We may state this briefly as follows: the original publisher maintains content control of the original, but no longer has context control of how it is seen.

There are two sides of this issue to be resolved. The publishers' concerns may best be summarized as (1) appropriate remuneration and (2) the integrity of the original. The public's concern is what we may call freedom of fair use.

The best way to resolve these two needs is to guarantee them both. The publisher or author must be able to control what is in the original work; and this must remain available and identifiable in its pure, unmarked and original form. But it is also vital that others besides the original publishers be allowed to rework that material freely, in whatever ways they want and need. We need to be able to use and adapt anything in our own ways.

This is precisely why legendary superhacker Richard Stallman has demanded an end to copyright. Existing copyright law, says Stallman, prevents people from being able to use things freely; particularly in the realm of computer programs, where present-day licensing and trade secret practice deny the user access to source code and the chance to adapt it as he or she sees fit.

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The important thing is for each viewpoint to be available in its pristine state... to have shutters that open selectively to whatever linked material the user wants to see.

Thus the first published form of a thing is not the only form it may take -- a vital matter for the improvement of our thought and work.

The alternative (which I have argued extensively with Stallman) is to have a full-access storage system that allows you to create your own versions freely from other works, but still maintains all the linkages and connections the original may have. (This also permits copyright and royalty to be handled unobtrusively.) Thus everyone may paint their own mustaches on the Mona Lisa -- so long as the original remains unscathed and available to all.

2. Freedom of the Links: Reverse Link-Following

Open hypertext means special freedom of the links. I already defined hypertext as non-sequential writing with free user movement. This means not just the ability to follow connections in the direction they were originally made, but to follow them backwards as well. This is both hard to explain and hard to arrange for, but in future years it will be recognized as vital to our understandings and to our freedoms.

In the hypertext systems we see now, it is possible to jump from a marker in one place to something else. It is not always possible to jump back; there may be no symbolic marker to permit this, and there may have been no intent by the author that you should.

This inability can be multiplied a millionfold in hypertext publishing, where vast numbers of documents offer jumps to other documents. You want to be able to go back, to undo these jumps and return to your previous context.

But more than that. You want to be able to look at a document and say, ''Who has links to this document?'' These are the in- links, not authorized by the original author, and you want to be able to ride them backwards across the great corpus of published electronic writings.

There are many reasons you could want to do this. Usually, the target document will be older; you want to see the more recent work related to it. Or you want to see what comments have been made on it, or what quotes it.

These things may tell you what work has come later, what items followed, what criticism occurred, what summaries may be found of this work, where it fits into others' summaries of the field, who said what and when. And on and on.

The same applies to quotations. Being able to ask, ''Who has quoted this?'' will be a vital facility for essentially the same reasons.

Creators of text systems generally begin by assuming that reverse link-following is not necessary. (They may then decide to add it afterwards.) However, it is a difficult feature to add on seriously, and only if it is built in at the very bottom can we include in our reverse link-following everything that is published, and not have this capability restricted.

3. Boundaries and Access

You could have a universal hypertext system with strong cost boundaries and access gradients -- whether of convenience, time or financial cost. For instance, things stored near you might be accessible very cheaply, but things more remote might cost substantially more in one way or other -- thus strongly discouraging the use of that which is over the hill and far away.

Many enthusiasts of CD-ROM, for instance -- the permanently-etched disks that hold a lot and fit in your palm -- seem to want a world much more like the present one. In this CD-ROM world, you will only have access to the things that you buy in advance, on your own private disk; you will only be able to roam among those parts that you personally own and have physically present at your computer, local and prepaid.

Whereas the network view, which I urge, is that you can use it all without boundaries, and without regard to where the material is physically stored, paying for use at the moment you draw forth material, not having to buy a huge block at the outset. A seamless world of accessibility will be very different from one with hurdles and tollbooths, and profoundly more useful.

Toward a Singular Tomorrow

The long-term issue is not to create many separate functions, or ''functionalities'', for handling separate kinds of textual work. (This is what we have been drifting into, with absurd distinctions between programs called ''word processors'' and ''outline processors'' and ''desktop publishing programs''.) The long-term issue is to provide an electronic literature.

Today there are thoughtful, intelligent and literate people everywhere. Many of them have something to contribute, but only they know it. The hurdles are pretty high. Today, on paper, a person can ordinarily only publish fairly large and completed works -- books and articles. (There is also the genre of the ''letter to the editor'', but only a few make it to print.)

In tomorrow's open hypertext world, however, with anyone free to publish links, we may expect an extraordinary blossoming of addenda and new forms of useful contributions -- as we are already seeing on the computer networks, albeit in forms that are still extremely clumsy.

What I have been trying to communicate here is a sense of manifest destiny: we must recognize that the hypertext future is destined to be open, vast, free, and without retriction; with all participants and all links on a formally equal footing; in which intellectual property will not be an encumbrance but (like other property rights) a simple precondition, handled by a simple mechanism for automatic royalty payments and acknowedgment of origins. All this will bring a vast, new, practical and intellectual freedom: What I call open hypertext publishing.

Extraordinary freedom of information lies ahead of us, a world little dreamed of before now. But it will lie beyond mere hypertext, and will have to be more than simply a universal hypertext network. As a free people we will want an open universal hypertext network. And that requires that we understand the freedoms that are possible -- and demand them, and create them. And understanding this, we can proceed directly to the creation of that world, without wasting precious decades, and without entrenching bad or inappropriate systems which might encumber those freedoms.

Can't you hear the sound of the ocean? We're getting nearer.

Ted Nelson coined the word ''hypertext'' and ''hypermedia'' over two decades ago. An overview of his hypertext views will be found in his books Computer Lib (Microsoft Press, 1987) and Literary Machines (available from Project Xanadu for $25), which also descrbies the Xanadu storage and publishing system -- that ideal hypertext system variously discussed in these columns.*

He may be reached at Project Xanadu, 8480 Fredericksburg #138, San Antonio TX 78229.

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